

Claims

- [c1] 1. An under-ball-metallurgy layer, comprising:
an adhesion layer;
a barrier layer over the adhesion layer, wherein the barrier layer is fabricated using a nickel-vanadium alloy;
and
a wettable layer over the barrier layer, wherein the wettable layer is fabricated using copper and has a thickness between about 3 to about 8 μ m.
- [c2] 2. The under-ball-metallurgy layer of claim 1, wherein material constituting the adhesion layer is selected from a group consisting of titanium, titanium-tungsten alloy, aluminum and chromium.
- [c3] 3. The under-ball-metallurgy layer of claim 1, wherein the adhesion layer has a thickness between about 0.1 to about 1 μ m.
- [c4] 4. The under-ball-metallurgy layer of claim 1, wherein the barrier layer has a thickness between about 0.1 to about 1 μ m.
- [c5] 5. The under-ball-metallurgy layer of claim 1, wherein the barrier layer is formed by sputtering.

- [c6] 6. The under-ball-metallurgy layer of claim 1, wherein the wettable layer is formed by electroplating.
- [c7] 7. The under-ball-metallurgy layer of claim 1, wherein the wettable layer is formed by sputtering and electroplating.
- [c8] 8. A flip-chip structure, comprising:
a chip having an active surface with a passivation layer and a plurality of contact pads thereon, wherein the passivation layer has a plurality of openings and each said opening exposes a contact pad;
an under-ball-metallurgy layer over the contact pad, including:
an adhesion layer;
a barrier layer over the adhesion layer, wherein the barrier layer is fabricated using a nickel-vanadium alloy;
and
a wettable layer over the barrier layer, wherein the wettable layer is fabricated using copper and has a thickness between about 3 to about 8 μ m; and
a plurality of bumps on each wettable layer.
- [c9] 9. The flip-chip structure of claim 8, wherein material constituting the adhesion layer is selected from a group consisting of titanium, titanium-tungsten alloy, alu-

minum and chromium.

- [c10] 10. The flip-chip structure of claim 8, wherein the adhesion layer has a thickness between about 0.1 to about 1 μ m.
- [c11] 11. The flip-chip structure of claim 8, wherein the barrier layer has a thickness between about 0.1 to about 1 μ m.
- [c12] 12. The flip-chip structure of claim 8, wherein the barrier layer is formed by sputtering.
- [c13] 13. The flip-chip structure of claim 8, wherein the wettable layer is formed by electroplating.
- [c14] 14. The flip-chip structure of claim 8, wherein the wettable layer is formed by sputtering and electroplating.
- [c15] 15. The flip-chip structure of claim 8, wherein material constituting the passivation layer includes an inorganic compound.
- [c16] 16. The flip-chip structure of claim 8, wherein material constituting the passivation layer includes high molecular weight polymer.
- [c17] 17. The flip-chip structure of claim 8, wherein material constituting the bump includes a lead-tin alloy.

- [c18] 18. The flip-chip structure of claim 8, wherein material constituting the bump includes a lead-free alloy.
- [c19] 19. The flip-chip structure of claim 18, wherein material constituting the bump is selected from a group of metals consisting of tin, gold, silver, copper, bismuth, antimony, indium, zinc or various combinations of the metals.
- [c20] 20. An under-ball-metallurgy layer, at least comprising:
an adhesion layer;
a barrier layer sputtered over the adhesion layer; and
a wettable layer over the barrier layer, wherein the wettable layer is fabricated using copper and has a thickness between about 3 to about 8 μ m.
- [c21] 21. The under-ball-metallurgy layer of claim 20, wherein material constituting the adhesion layer is selected from a group consisting of titanium, titanium-tungsten alloy, aluminum and chromium.
- [c22] 22. The under-ball-metallurgy layer of claim 20, wherein the adhesion layer has a thickness between about 0.1 to about 1 μ m.
- [c23] 23. The under-ball-metallurgy layer of claim 20, wherein the barrier layer has a thickness between about 0.1 to

about 1 μ m.

[c24] 24. The under-ball-metallurgy layer of claim 20, wherein the wettable layer is formed by electroplating.

[c25] 25. The under-ball-metallurgy layer of claim 20, wherein the wettable layer is formed by sputtering and electroplating.